

Aldehydes and ketones

Ar CHO

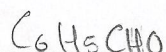
RCHO

No reaction

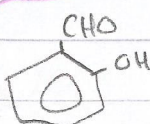
Fehling OR
Benedict

Red ppt $\text{Cu}_2\text{O} \downarrow$

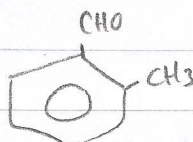
Nomenclature of Aldehydes



Benzaldehyde



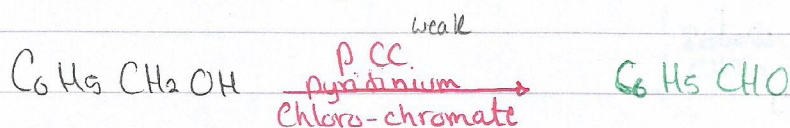
Salicylaldehyde



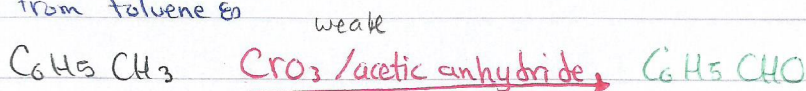
o-tolualdehyde

Preparation of Aldehydes

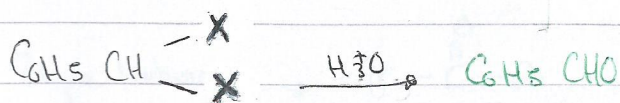
① By oxidation of benzyl alc.



② From toluene



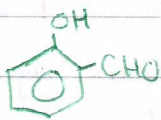
③ From $\text{C}_6\text{H}_5\text{CHCl}_2 \rightarrow$ Benzalchloride



④ From Phenol



$\text{NaOH} / \text{CHCl}_3$ or CCl_4
Formylation



Reimer-Tiemann Formylation

2-pentanone

Aliphatic

methyl phenyl ketone

OR Acetophenone

Diphenyl ketone

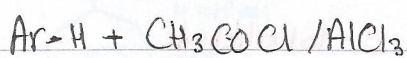
or Benzophenone

1-phenyl-2-butanone

Aliphatic

preparation of ketones

① F.C acylation

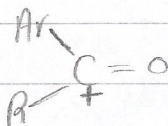
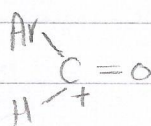


Reaction of Ketones and Aldehydes

Why Aldehydes are more reactive than Ketones?

Due to electronic factor and steric factor

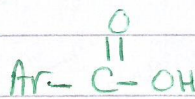
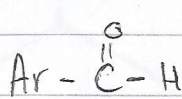
↓
Crowding



d) Oxidation

Ald $\rightarrow$ easily oxidized

• Ketones $\rightarrow$ resist oxi.



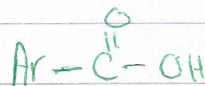
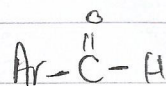
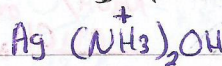
acid

Oxidizing agents

Strong [0]

Weak or Fehling & Benedict (oxidize RCHO only)

Monoxide is Tollen's reagent



(silver mirror)

* How to differentiate between C_6H_5CHO & $C_6H_5COCH_3$?

Tollen's

Silver mirror

no reaction

(L)

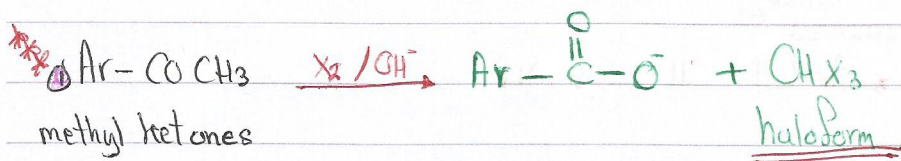
* How to differentiate between (Aromatic) benzaldehyde and (Aliphatic) acetaldehyde?

Fehling
↓
Benedict

No reaction

Red ppt of Cu_2O ↓

2) Oxidation of ketones &



Haloform used to distinct COCH_3

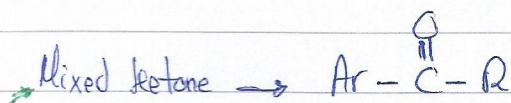
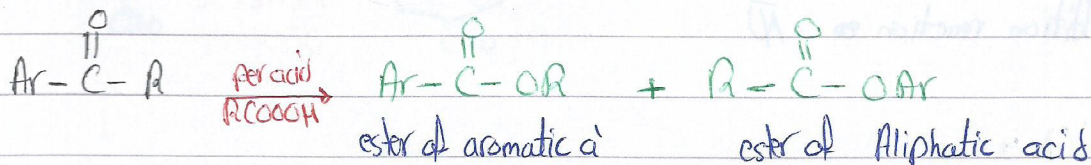
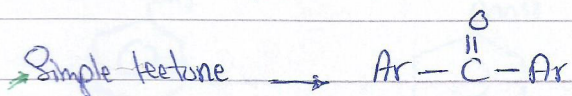
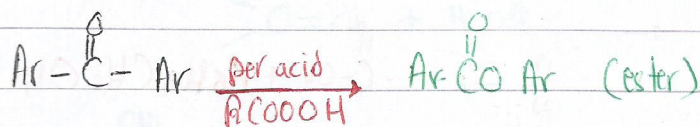
* How to differentiate between (ether) $\text{C}_6\text{H}_5\text{OCH}_3$ and (ketone) $\text{C}_6\text{H}_5\text{COCH}_3$?

Iodoform
 CHI_3
↓

no reaction

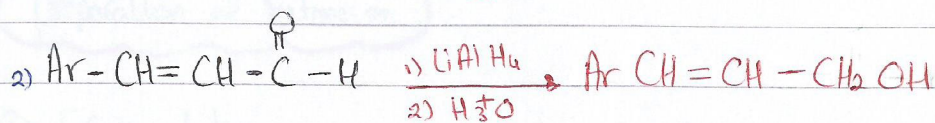
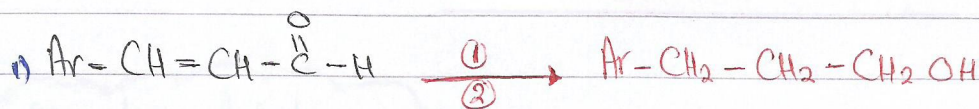
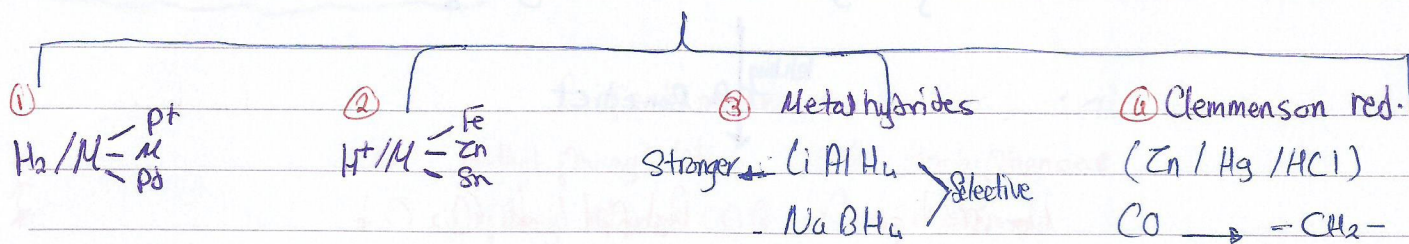
yellow

② Bayer-Villiger oxidation &

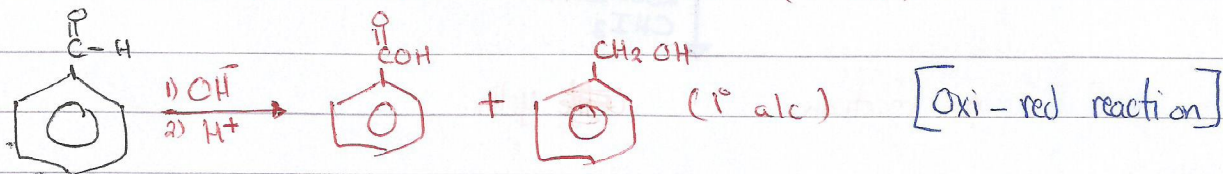


3) Reduction

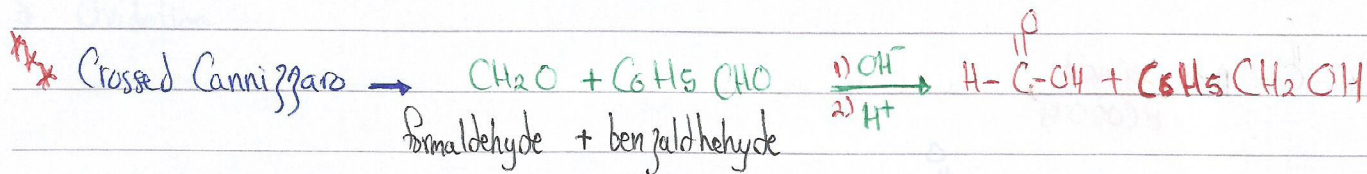
148



4) Cannizzaro reaction For Ald with no $(\alpha-H)$

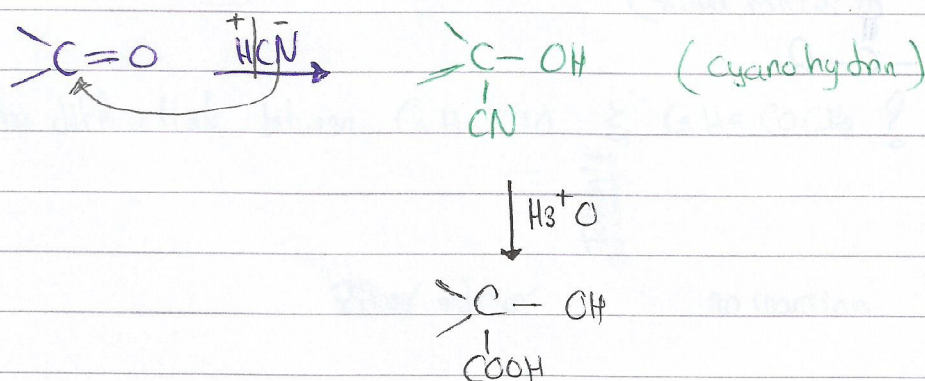


benzaldehyde

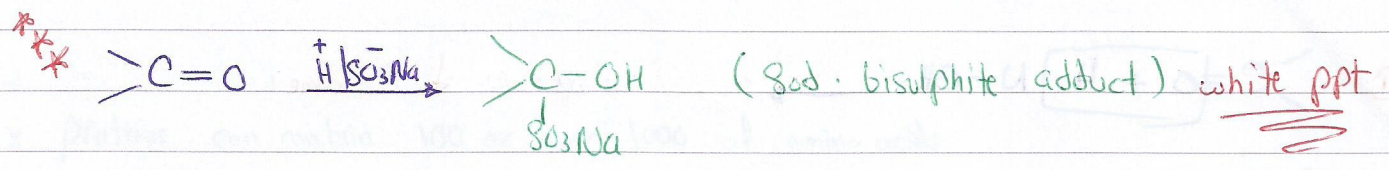


5) Nucleophilic addition reaction

A) Addition of HCN

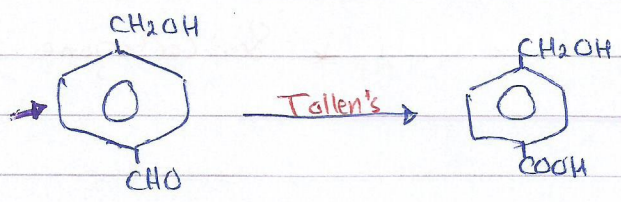


B) Addition of Na bisulphite (NaHSO_3) $\text{H}^+ | \text{SO}_3^- \text{Na}$

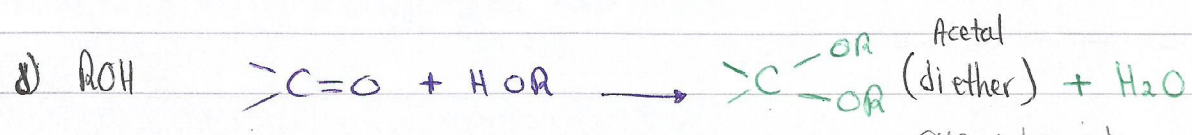
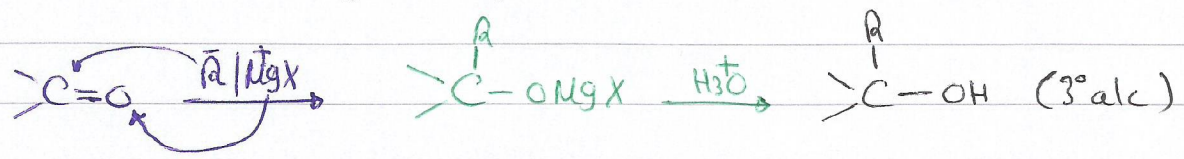


How to differentiate between $\text{C}_6\text{H}_5\text{COR}$ and $\text{C}_6\text{H}_5\text{OR}$?

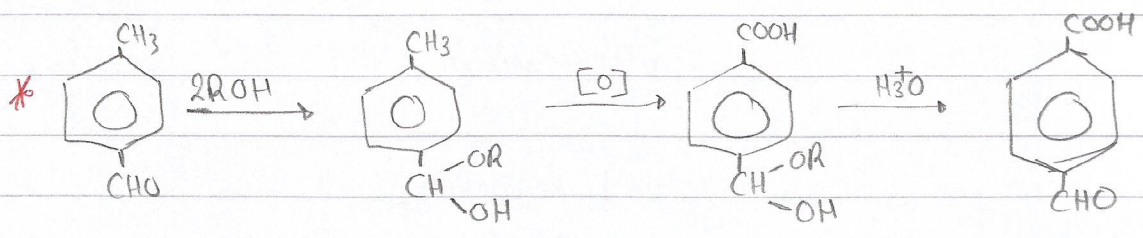
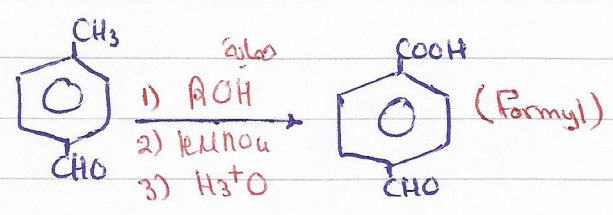
alkyl phenyl ketone | alkyl phenyl ether
 white ppt $\swarrow$ OR $\searrow$ NaHSO_3
 OR yellow $\nwarrow$ NaHSO_3 $\swarrow$ NaHSO_3
 -ve



c) $\text{R}^- | \text{Mg}^+ \text{X}$ Grignard reagent so



CHO also gives ppt with NaHSO_3



e) H_2N-G Ammonia derivatives

